

Claims

- [c1] 1.A high temperature gas seal, in its pre-fired state, comprising ceramic fibres, ceramic powder, and a binder, wherein the seal is unsintered and has a porosity less than 50% and which, in its fired state, has a higher porosity and is substantially free of binder.
- [c2] 2.The seal of claim 1 for use in a high temperature fuel cell.
- [c3] 3.The seal of claim 2 wherein the ceramic fibres and ceramic powder may be the same material or different and may comprise alumina or zirconia.
- [c4] 4.The seal of claim 3 wherein the seal has a pre-fired porosity of less than about 45%.
- [c5] 5.The seal of claim 4 wherein the seal has a pre-fired porosity of less than about 40%. .
- [c6] 6.The seal of claim 5 wherein the seal has a pre-fired porosity of less than about 35%.
- [c7] 7.The seal of one of claims 1 to 6, which is formed by a tape casting process.

- [c8] 8.The seal of claim 7 which has a fired porosity of less than about 50%.
- [c9] 9.The seal of claim 8 which has a fired porosity of less than about 45%.
- [c10] 10.The seal of claim 9 which has a fired porosity of less than about 40%.
- [c11] 11.A method of forming a ceramic high temperature gas seal comprising the steps of:
(a)mixing a plurality of ceramic fibres with one or more ceramic powders and an organic binder in a liquid to form a slurry;
(b)forming the tape; and
(c)drying the tape to form a pre-fired seal.
- [c12] 12.The method of claim 11 wherein the tape forming step may comprise tape casting, pressure rolling, slurry coating, shear compaction or cold pressing.
- [c13] 13.The method of claim 12 wherein the tape forming step comprises tape-casting.
- [c14] 14.The method of claim 11 wherein the ceramic fibres and ceramic powder may comprise the same material or different materials and may comprise alumina or zirconia.

- [c15] 15.The method of claim 11 wherein the liquid is either aqueous or non-aqueous..
- [c16] 16.The method of claim 15 wherein the liquid is a non-aqueous liquid and comprises an aliphatic or aromatic hydrocarbon.
- [c17] 17.The method of claim 16 wherein the non-aqueous liquid comprises a combination of toluene, a ketone and an alcohol.
- [c18] 18.The method of claim 16 wherein the non-aqueous liquid comprises a combination of a ketone and an alcohol.
- [c19] 19.The method of claim 11 wherein the organic binder comprises polyvinyl butyral.
- [c20] 20.The method of claim 11 wherein the slurry further comprises a plasticizer.
- [c21] 21.The method of claim 20 wherein the plasticizer comprises polyethylene glycol, dibutyl phthalate, benzyl butyl phthalate or any combination thereof.
- [c22] 22.The method of claim 11 wherein the slurry further comprises a dispersant.
- [c23] 23.The method of claim 22 wherein the dispersant com-

prises a phosphate ester.